

NEW MOLLUSKS FROM CAMAGUEY AND SANTA CLARA PROVINCES, CUBA.

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The new mollusks herein described are of the genera *Opisthosiphon* and *Eutudora* only, and are all from the Cubitas range of mountains in Northern Camaguey or from certain detached portions of the system lying to the east near the boundary line of the Oriente Province, or to the west, near, or just over, the boundary line of the Santa Clara Province. New species of other genera from the same general region will be published in a forthcoming paper, when a full discussion of the notable features of this somewhat isolated faunula may more properly be presented. A brief description of the Sierra de Cubitas has, however, already appeared.¹ A few species of the Urocoptidae from this region have been described, and these will be included in the forthcoming paper referred to. But one species of *Opisthosiphon*² of this region has heretofore appeared in print, and that one is herein republished in order to complete this list of the Annulariidae.

As one of the genera and two of the subgenera to which all these new species are referred are of so recent creation, it may be well to refer to their descriptions in the Proceedings of the United States National Museum (vol. 58, pp. 49-82). The subgenus *Opisthosiphon* includes species of the genus *Opisthosiphon* destitute of spiral sculpture outside of the umbilical walls, the typical subgenus admitting these species possessing spiral sculpture on the spire of the shell even though obsolete.

The genus *Eutudora* includes species with a typical Tudoroid operculum but having some form of breathing device to enable the animal to obtain air when the aperture is closed by withdrawal of the operculum. The subgenus *Eutudorops* includes members of *Eutudora* that possess an axial sculpture rendered wavy or articulate by more or less obsolete spiral cords.

¹ Nautilus, vol. 29, No. 2, p. 17, June, 1915.

² *O. berryi* Clapp, Nautilus, vol. 32, No. 3, p. 86, January, 1919.

The following are the species of these groups so far known from the region in question:

- Opisthosiphon* (*Opisthosiphona*) *berryi* Clapp.
Opisthosiphon (*Opisthosiphona*) *berryi berryi* Clapp.
Opisthosiphon (*Opisthosiphona*) *berryi semiapertum*, new subspecies.
Opisthosiphon (*Opisthosiphona*) *paredonense*, new species.
Opisthosiphon (*Opisthosiphona*) *paredonense paredonense*, new subspecies.
Opisthosiphon (*Opisthosiphona*) *paredonense transitorium*, new subspecies.
Opisthosiphon (*Opisthosiphona*) *obturatum*, new species.
Opisthosiphon (*Opisthosiphona*) *obturatum obturatum*, new subspecies.
Opisthosiphon (*Opisthosiphona*) *obturatum subobturatum*, new subspecies.
Opisthosiphon (*Opisthosiphona*) *obturatum banaoense*, new subspecies.
Opisthosiphon (*Opisthosiphona*) *apertum*, new species.
Opisthosiphon (*Opisthosiphona*) *dalli* Torre and Henderson.
Opisthosiphon (*Opisthosiphona*) *bioscai*, new species.
Opisthosiphon (*Opisthosiphona*) *bioscai bioscai*, new subspecies.
Opisthosiphon (*Opisthosiphona*) *bioscai tersum*, new subspecies.
Opisthosiphon (*Opisthosiphona*) *salustii*, new species.
Opisthosiphon (*Opisthosiphona*) *evanidum*, new species.
Opisthosiphon (*Opisthosiphona*) *evanidum evanidum*, new subspecies.
Opisthosiphon (*Opisthosiphona*) *evanidum degeneratum*, new subspecies.
Opisthosiphon (*Opisthosiphona*) *occultum*, new species.
Opisthosiphon (*Opisthosiphon*) *protractum*, new species.
Opisthosiphon (*Opisthosiphon*) *judasense*, new species.
Opisthosiphon (*Opisthosiphon*) *detectum*, new species.
Opisthosiphon (*Opisthosiphon*) *obtectum*, new species.
Opisthosiphon (*Opisthosiphon*) *obtectum obtectum*, new subspecies.
Opisthosiphon (*Opisthosiphon*) *obtectum tenuicostum*, new subspecies.
Opisthosiphon (*Opisthosiphon*) *lamellicostatatum*, new species.
Eutudora (*Eutudorops*) *paradoxum*, new species.

OPISTHOSIPHON (OPISTHOSIPHONA) BERRYI Clapp.

Opisthosiphon berryi CLAPP, *Nautilus*, vol. 32, No. 3, 1919, p. 86, pl. 7, fig. 14.

Plate 38, figs. 1-4.

Shell longitudinally finely plicate, ochraceous buff, encircled with a broad chocolate-brown band on the periphery of the last whorl and on the lower half of the earlier whorls; slightly shining; decollated. Suture deep, crenate, four or five spiral ridges appearing on the umbilical region. Remaining whorls four, very convex. Aperture

vertical, circularly oval; peristome white, double; the inner, a brief continuation of the whorl; the outer, on the right side, smooth, slightly expanded, at the suture broadly expanded and excavated over the breathing tube, adnate to the penultimate whorl; columellar margin expanded horizontally above in a broad flange adnate to the penultimate whorl, a large lobe curving over and nearly covering the umbilical region, interrupted below by a broad sinus where the lip is abruptly reflexed and attached to the whorl, a smaller lobe expanded horizontally below. A minute breathing pore within the aperture near the posterior angle connects with a tube, somewhat concealed in the expanded and excavated lip, which, curving back to the suture, descends and ends in the narrow space between the ultimate and penultimate whorls. Numerous strong raised lamellae mostly originating on the inner lip, but occasionally extending along the parietal lip, cover that portion of the tube visible within the lip. Operculum as in *Opisthosiphon pupoides* Morelet.

Type.—In the collection of the Museum of Comparative Zoology, Cat. No. 42005. It was collected by Dr. S. S. Berry at Cairije, Cerro de Tuabaquey, Province Camaguey, Cuba, and measures: Length, 13.5 mm.; greater diameter, 9 mm.; lesser diameter, 7.3 mm.; altitude of aperture, 4.7 mm.; width of aperture, 4 mm. A paratype from the same locality is in Doctor Berry's collection. It measures: Length, 14.5 mm.; greater diameter, 9.7 mm.; lesser diameter, 7.5 mm.; altitude of aperture, 5.5 mm.; width of aperture, 4.3 mm.

OPISTHOSIPHON (OPISTHOSIPHONA) BERRYI BERRYI Clapp.

Plate 38, figs. 1-4.

This, the typical subspecies, is characterized by the greater expansion of the peristome which completely conceals the umbilicus. It appears to be confined to the locality given for Mr. Clapp's type.

OPISTHOSIPHON (OPISTHOSIPHONA) BERRYI SEMIAPERTUM, new subspecies.

Plate 38, figs. 5-8.

The rather solid shell is ovate conic with open umbilicus partially concealed by the inner expansion of the peristome; decollated, leaving three and a half to four convex whorls. The color is ochraceous buff to very light yellow or straw—(a) unicolor, (b) with a single narrow or broad band of chestnut, (c) with several revolving rows of small rufous spots. The suture is deeply impressed and more or less irregularly crenulate by the thickening of the axial lirae into hollow white bulbs, becoming larger and more prominent on the summit of the last whorl, especially near the aperture. The sculpture consists of axial lirae, more widely spaced upon the earlier whorls, but quite densely disposed upon the last whorl. Within the umbilical region are five or six low cords crossed by the axial threads. The

vertical aperture is ovate, pointed above. The peristome is double consisting of an inner peritreme but slightly produced, and an outer peritreme moderately expanded on the outer margin but considerably so on the inner, where it is recurved and bent back partially to conceal the umbilicus and then becoming adnate to the penultimate whorl, it again expands above the aperture into a deeply laminated pointed extension and bent back from the plane of the aperture. From this upper expansion and back of it projects a siphonal tube, which extends downward between the last and penultimate whorls and opens into the umbilical space. This tube communicates with the interior of the last whorl through the opening just back of the aperture in the upper angle of the whorl. The operculum is normal.

Type.—Cat. No. 314945, U.S.N.M., a female specimen, comes from the Circulo cave in the Province of Camaguey, Cuba, and measures: Length, 13 mm.; greater diameter, 9 mm.; lesser diameter, 7 mm.; length of aperture within, 5 mm.; width of aperture within, 3.5 mm.

Measurements of other specimens are as follows: Male, length, 9.75 mm.; greater diameter, 8.1 mm.; lesser diameter, 5.75 mm.; length of aperture within, 4 mm.; width of aperture within, 3 mm. Female, length, 16.5 mm.; greater diameter, 11.25 mm.; lesser diameter, 8.75; length of aperture within, 6 mm.; width of aperture within, 5 mm.

Specimens were collected in the following localities in the Province of Camaguey, Cuba: Cerro de Tuabaquey, El Cercado, San Francisco, Cueva del Circulo, La Loma, Corral de Cairije, Los Cangilones, etc., all in the eastern part of the Sierra de Cubitas, by Biosca, Torre, Henderson, Simpson, Sifontes, and Salustio Garcia. This species was first found by Federico Biosca, professor of natural history in the Institute of Camaguey.

This subspecies differs from the typical subspecies chiefly in the lesser expansion of the peristome over the umbilicus and in its greater color variation.

OPISTHOSIPHON (OPISTHOSIPHONA) PAREDONENSE, new species.

Plate 38, figs. 9-11.

The shell is oblong-ovate, quite solid, umbilicated, truncated, leaving three and a half to four convex whorls. The last whorl is solute for a distance of about two millimeters. The suture is deep and irregularly crenulate. The color range is from a pale russet to purplish brown, sometimes unicolored, but generally encircled below the periphery by a band of dark purple. The sculpture consists of axial threads more widely spaced upon the early postnuclear whorls and increasing in number upon the succeeding whorls. On the last whorl the riblets are densely crowded (eight to nine to one millimeter).

At the summit of the whorls, just below the suture, many of the riblets are expanded into hollow bulbs, often several meeting to form one bulb. Spiral sculpture consists only of about twelve low cords within the umbilical region. The aperture is vertical, oval, somewhat pointed above; the peristome is duplex, the inner peritreme is not produced; the outer peritreme is but slightly expanded, evenly so all around in the typical form, not so in another subspecies; above the posterior angle of the aperture the expanded peristome is gathered into a triangular projection ending in a short siphonal tube, which curves backward and then toward the penultimate whorl. The tube communicates with the interior of the shell at a point just back of the aperture in the posterior angle. Operculum typical. Type measurements are given under subspecies.

OPISTHOSIPHON (OPISTHOSIPHONA) PAREDONENSE PAREDONENSE, new subspecies.

Plate 38, figs. 9-11.

This, the typical subspecies, is characterized by the even expansion of the peristome about the aperture. It never touches the whorl above.

Type.—A female specimen, Cat. No. 314946, U.S.N.M., comes from Los Paradones, Camaguey Province, Cuba. It measures: Length, 10.75 mm.; greater diameter, 9.4 mm.; lesser diameter, 7 mm.; length of aperture within, 5.5 mm.; width of aperture within, 4 mm. Another specimen, a male, measures: Length, 10.75 mm.; greater diameter, 8.15 mm.; lesser diameter, 6.7 mm.; length of aperture within, 4.5 mm.; width of aperture within, 3.8 mm.

Representatives of this subspecies come from Camaguey Province, Cuba at Los Paradones, a narrow pass through the Cubitas range of mountains. They were collected by Salustio Garcia, Pablo Sifontes, Torre, Henderson, and Simpson.

OPISTHOSIPHON (OPISTHOSIPHONA) PAREDONENSE TRANSITORIUM, new subspecies.

Plate 39, figs. 1-2.

A subspecies distinguished from the typical subspecies by reason of the uniformly greater expansion of the peristome on the inner side. This is not, however, carried to the extent sufficient to conceal the umbilicus, but it does touch or impinge upon the next whorl above. All other features are identical.

Type.—Cat. No. 314947, U.S.N.M., is from the entrance of La Guanaja or Paso del Este, in the Cubitas Mountains, Camaguey Province, Cuba, and measures: Length, 11.8 mm.; greater diameter, 8.5 mm.; lesser diameter, 6.75 mm.; length of aperture within, 4.5 mm.; diameter of aperture within, 3.5 mm. It is a female specimen.

Male specimens are smaller.

OPISTHOSIPHON (OPISTHOSIPHONA) OBTURATUM, new species.

Plate 39, figs. 3-6.

The shell is ovate-conic, decollated, thin but solid, umbilicus either entirely closed by an affixed and adnate expansion of the peristome or partially so by a less expanded peristome. The color is of a light straw to dark russet, unicolorous or with one dark chestnut band; none are dotted. Whorls are convex with a deeply impressed suture which is crenulated by the thickening of alternate lirae into hollow white bulbs. The last whorl is adnate or slightly solute. The sculpture consists of axial threadlike riblets which are not increased in number upon the later whorls, there being about four to each millimeter. Spiral sculpture is confined to about four or five low cords within the umbilical region. These are not apparent in perfect specimens where the umbilicus is hidden by the peristome expansion. The aperture is vertical, oval, and slightly arched above. The double peristome is white. The inner peritreme is not projecting but slightly recurved over the outer peritreme. The latter is expanded all around, evenly and regularly so on the outer side. On the inner side it abruptly curves down to close completely or partially the umbilicus and to cover a space along the penultimate whorl. Finally, above the posterior angle of the aperture it again expands into a concave triangular-shaped projection which is a part of and supports a siphon which bends back and down to terminate in the suture just back of the aperture. The surface of the expanded outer peritreme is concentrically ribbed, most prominently so in the triangular projection above. The operculum is normal, but shows an individuality in that the calcareous portion does not reach to the edge of the basal horny plate. A tendency is also shown in the slight raising of the edges of the lamellae to suggest the Annularia structure.

Three subspecies are indicated:

OPISTHOSIPHON (OPISTHOSIPHONA) OBTURATUM OBTURATUM new subspecies.

Plate 39, figs. 3-6.

This, the typical subspecies, is characterized by the extreme expansion of the peristome which completely covers and seals the umbilicus and becomes adnate to the adjoining whorl. The last whorl is not solute.

Type.—Cat. No. 314948, U.S.N.M., is from Paso de Lesca (or Cocinas) in the Sierra de Cubitas, Camaguey Province, Cuba. It measures: Length, 15 mm.; greater diameter, 10 mm.; lesser diameter, 8.5 mm.; length of aperture within, 6 mm.; diameter of aperture within, 4 mm. It is a female specimen.

Taken also at the Paso de la Escalera near Ermita Vieja in the same range of hills, by Torre, Henderson, and Simpson.

OPISTHOSIPHON (OPISTHOSIPHONA) OBTURATUM SUBOBTURATUM, new subspecies.

Plate 39, figs. 7-11.

This subspecies differs from the typical form in that the umbilicus is not wholly closed nor concealed by the expansion of the peristome and in that the last whorl is shortly solute. The color is generally dark and shows a tendency in some specimens to a single narrow dark band.

Type.—A female, Cat. No. 314949, U.S.N.M., was collected by Torre, Henderson, and Simpson in the cave of Los Indios in the District of Banao, western part of the Cubitas range, Province of Camaguey, Cuba, and measures: Length, 13.9 mm.; greater diameter, 8.9 mm.; lesser diameter, 7.5 mm.; length of aperture within, 4.6 mm.; diameter of aperture within, 3.75 mm.

OPISTHOSIPHON (OPISTHOSIPHONA) OBTURATUM BANAENSE, new subspecies.

This form resembles the typical subspecies in having the umbilicus wholly sealed over by the expanded peristome, or, if not actually sealed and closed thereby, at least wholly covered and concealed. The only persistent difference is one of size, specimens of this form being uniformly smaller. As in *Opisthosiphon (Opisthosiphona) obturatum*, shells are usually banded. The color of the tip and first nepionic whorl is reddish.

Type.—Cat. No. 314950, U.S.N.M., was collected by Torre near Banao, in the western part of the Cubitas range, Camaguey Province, Cuba, and measures: Length, 11.75 mm.; greater diameter, 8.75 mm.; lesser diameter, 7.4 mm.; length of aperture within, 4.9 mm., diameter of aperture within, 3.4 mm.

OPISTHOSIPHON (OPISTHOSIPHONA) APERTUM, new species.

Plate 40, figs. 1 and 3.

The shell is ovate-conic, rather solid, umbilicated, decollated, narrowly truncated, leaving four convex whorls, the last being shortly solute. The color is usually a pale straw of bright luster, but some specimens are darker even to rich wine color. The lighter tinted shells have a narrow reddish brown sub-peripheral band. The sculpture consists of fine axial threads, more widely spaced and elevated upon the earlier postnuclear whorls, but more crowded and flatter on the last whorl. Most of the axial threads are expanded into very minute white bulbs at the suture, forming an inconspicuous irregular crenulation. Spiral sculpture confined to nine to ten low inconspicuous cords within the umbilicus. The aperture is vertical, oval, and obtusely pointed above. The double peristome has the inner peritreme scarcely projecting, and the outer peritreme but slightly expanded on the right, but somewhat more so on the left or inner side, though not reflected over the umbilicus nor sufficiently

extended to touch the adjoining whorl. Above the posterior angle of the aperture the peristome forms a triangular projection merging into a siphon which recurves and points back toward the adjacent whorl, though not usually forming a contact with it. The siphon communicates with the interior of the shell by a hole just within the aperture. The operculum is typical.

Type.—A female specimen, Cat. No. 314951, U.S.N.M., was collected by Torre at Paso de Lesca in the Cubitas Mountains, Camaguey Province, Cuba, and measures: Length, 12.8 mm.; greater diameter, 9.75 mm.; lesser diameter, 7.4 mm.; length of aperture within, 5 mm.; width of aperture within, 4 mm. A male specimen from the same locality measures: Length, 10.9 mm.; greater diameter, 9 mm.; lesser diameter, 6.4 mm.; length of aperture within, 4 mm.; width of aperture within, 3.5 mm.

This species is characterized by its open umbilicus, moderate expansion of the peristome, inconspicuous sutural crenulation, and its shining surface.

OPISTHOSIPHON (OPISTHOSIPHONA) DALLI Torre and Henderson.

Plate 40, figs. 2, 8, 9.

Opisthosiphon dalli TORRE and HENDERSON, A New Opisthosiphon from Cuba. Privately published June 25, 1920.

Opisthosiphon (Opisthosiphona) dalli HENDERSON and BARTSCH, Proc. U. S. Nat. Mus., vol. 58, p. 68, 1920.

The shell is turbinate, solid, widely umbilicated, with the apex decollated, leaving three and a half to four convex whorls, the last being solute for a short distance, and carinated at the summit of the solute portion. The shell is of a pale brown color without trace of either bands or spots, the apical portion being conspicuously light reddish. The sculpture consists of densely crowded axial threads which are somewhat more distantly spaced upon the earlier post-nuclear whorls. Some of these axial threads are very minutely expanded into denticles at the summit, but not sufficiently so to lend a crenulated appearance to the deeply impressed sutures. The spiral sculpture consists of about ten or twelve low rounded cords within the umbilicus. The vertical aperture is roundly oval with a posterior angle. The peristome is not obviously double as the inner peritreme is but slightly expanded and reflected over and appressed to the outer. The outer peritreme is but slightly expanded on the outer side; on the inner side it is flatly expanded, though not sufficiently so to cover any portion of the umbilicus, nor more than sufficient barely to touch the preceding whorl. At the posterior angle of the aperture the peristome extends into an upward expansion forming an open siphonal tube. The operculum is typical of the genus.

Type.—Cat. No. 314941, U.S.N.M., is from the cave of El Circulo.

Measurements are: Length, 12.5 mm.; major diameter, 11.5 mm.; minor diameter, 8.75 mm.; length of aperture, 5.5 mm.; width of aperture, 4.5 mm.

This species is found at Camaguey Province, Cuba, on rocks about the entrance of La Cueva del Circulo in the eastern portion of the Cubitas Mountains.

This very handsome species is easily distinguished by its hard polished old-ivory surface which, to the naked eye, seems to be sculptureless and smooth, by its globose shape and relatively greater proportion of breadth to length, and, finally, by its reddish tip and entire lack of color bands or spots.

OPISTHOSIPHON (OPISTHOSIPHONA) BIOSCAL, new species.

Plate 40, figs. 4 and 6.

The shell is ovate-oblong, rather thin but strong; apex decollated, leaving three and a half to four moderately convex whorls, the last being very slightly solute. The umbilicus is (*a*) almost wholly closed or (*b*) partially so by an expansion of the inner peristome. The color is of a very light straw ranging through slightly darker yellowish tints to an amber or wine color. A series of brown spots encircles all the whorls, there being five such series on the last whorl of the holotype, but as many as eight in some specimens. In no instance are there solid color bands. The sculpture consists of axial thread-like riblets somewhat arched forward below the suture and never quite regularly disposed. In the typical subspecies these riblets are coarser (five to the millimeter) and these are partially effaced in the middle portion of the whorls, especially on the last two. In another subspecies the axial threads are finer (ten to the millimeter) and are not effaced. At the sutures, which are deeply impressed, most of the riblets, either singly or in tufts, form hollow white bulbs projecting up to touch the next whorl above, thus irregularly crenulating the sutures. A series of spiral cords are present within the umbilicus. These are crossed by the axial threads forming small projecting lamellar processes at the intersections. The vertical aperture is ovate and obtusely angled above. The peristome is double, having an inner peritreme that hardly projects and an outer peritreme which is but moderately expanded on the outer side but widely so on the inner side, even to covering (*a*) almost wholly, or (*b*) partially the umbilical opening above which it spreads over and (*a*) becomes adnate to the adjacent portion of the contiguous whorl or (*b*) merely touches it; it then forms above the aperture a delta-shaped expansion, roughly laminated on its face. This expansion supports and partially merges into a recurving siphon which bends down into the space back of the solute portion of the last whorl. This siphon opens into the shell by a small puncture just back of the aperture.

Measurements are given under the subspecific heads.

This species seems to be more generally distributed throughout the Cubitas range than any other of the group. In the various localities from which it has been taken some divergence in minor details is noted, but the two following subspecies account for the major differences in the shell characters.

OPISTHOSIPHON (OPISTHOSIPHONA) BIOSCAI BIOSCAI, new subspecies.

Plate 40, figs. 4 and 6.

This, the typical subspecies, is determined by the following three characters: The maximum expansion of the peristome, which almost wholly covers the umbilicus, though never quite closing it; the coarser axial riblets (five to the millimeter), which are more strongly developed in the upper and lower portions of each whorl, and, finally, the uniformly larger size of the shell.

Type.—A female specimen, Cat. No. 314952, U.S.N.M., from El Cercado measures: Length, 15 mm.; greater diameter, 9.25 mm.; lesser diameter, 7.5 mm.; length of aperture within, 4.5 mm.; width of aperture within, 3.75 mm. A male specimen measures: Length, 11.75 mm.; greater diameter, 7.75 mm.; lesser diameter, 6 mm.; length of aperture within, 3.75 mm.; width of aperture within, 3 mm.

Specimens were collected at El Cercado and Los Cangilones, San Francisco, Paredones, Paso de la Escalera, de las Cocinas, de las Trincheras, all in the Cubitas Mountains, Camaguey Province, Cuba, by Torre, Henderson, Simpson, Biosca, and Sifontes.

OPISTHOSIPHON (OPISTHOSIPHONA) BIOSCAI TERSUM, new subspecies.

The shell differs from the typical subspecies in being uniformly smaller, in the finer axial sculpture (ten riblets to the millimeter), in the equal prominence of these axial riblets over the entire portion of each whorl and in the lesser expansion of the peristome over the umbilical region. In many cases the expanded peristome hardly more than touches the whorl above and is never adnate to it.

Type.—A female, Cat. No. 314953, U.S.N.M., from "La Providencia" farm, measures: Length, 11.7 mm.; greater diameter, 7.2 mm.; lesser diameter, 6 mm.; length of aperture within, 3.8 mm.; width of aperture within, 3 mm. A male specimen measures: Length, 9.5 mm.; greater diameter, 7 mm.; lesser diameter, 5.5 mm.; length of aperture within, 3.5 mm.; width of aperture within, 2.9 mm.

This subspecies was collected by Torre, Henderson, and Simpson at "La Providencia," El Cercado, entrance to Paso de Lesca, on a small knoll; Camaguey Province, Cuba.

OPISTHOSIPHON (OPISTHOSIPHONA) SALUSTII, new species.

Plate 40, figs. 5 and 7.

The shell is ovate-conic, rather thin but strong, widely umbilicated, the apex decollated, leaving three and a half convex whorls, the last being shortly solute. The color is a pale straw with three to seven

series of brown spots encircling the whorls. The sculpture consists of axial sublamellar riblets, four to the millimeter, on the earlier postnuclear whorls and almost double that number on the last whorl, the spaces between being much wider than the riblets. A mere trace of an obsolete spiral sculpture may be detected in some specimens. At the sutures, every second or third riblet ends in a white lamellar expansion which produces an irregular crenulation along the deeply impressed sutures. There are ten to twelve prominent spiral cords within the umbilicus. The aperture is oblong-oval, obtusely angled above. The double peristome consists of a scarcely projecting inner, and a moderately expanded outer, peritreme. The greater expansion is on the inner side but is not sufficient to cover, even partially, the umbilicus, nor actually to touch the adjacent whorl above. Over the angle of the aperture the peristome expands into a delta shaped projection supporting a siphon which bends back and down into the space between the solute last whorl and the whorl above. The operculum is typical of the genus.

The type, Cat. No. 314954, U.S.N.M., is a female specimen from "Santa Rita" farm and measures: Length, 11.5 mm.; greater diameter, 8.25 mm.; lesser diameter, 6.5 mm.; length of aperture within, 4 mm.; width of aperture within, 3.25 mm. Another specimen, a male, measures: Length, 8 mm.; greater diameter, 7.25 mm.; lesser diameter, 5.1 mm.; length of aperture within, 3 mm.; width of diameter within, 2.5 mm.

This subspecies was collected by Salustio Garcia and P. Sifonte at "Santa Rita" farm near La Entrada and El Cercado; near Los Cangilones by the banks of the river Maximus, all in the eastern extremity of the Cubitas Mountains, Camaguey Province, Cuba.

OPISTHOSIPHON (OPISTHOSIPHONA) EVANIDUM, new species.

Plate 41, figs. 1-2.

The shell is elongate-conic, with open umbilicus and apex decolored, the last whorl being solute for a distance of 5 mm. The color is white without trace of color markings of any sort in the type, but showing in a subspecies a feeble tendency to encircling rows of spots. The sculpture consists of axial riblets somewhat irregularly disposed and about twice as numerous on the last whorl as upon the earlier postnuclear whorls, in all cases the intervals between the ribs being wider. At the summit of the whorls every second or third riblet is expanded into a small inconspicuous hollow bulb, giving to the suture an irregular crenulation. Within the umbilicus are about ten low spiral cords. The aperture is vertical, oblong and obtusely angled above; the inner peritreme of the peristome is slightly projecting; the outer peritreme is slightly expanded, a trifle more so on the inner side, but not sufficient even partially to conceal the umbil-

icus nor to touch the whorl above. Above the aperture the outer peritreme is expanded to form a delta-shaped projection and ending in a siphon which bends back and sometimes downward into the space between the solute last whorl and the whorl above. The operculum is typical of the genus.

This species includes two subspecies as follows:

OPISTHOSIPHON (OPISTHOSIPHONA) EVANIDUM EVANIDUM, new subspecies.

Plate 41, figs. 1-2.

This, the typical subspecies, is distinguishable chiefly by its uniformly greater size and by its whiter coloration.

Type.—Cat. No. 314955, U.S.N.M., is from the estate of "La Loma" near El Tuabaguey in the eastern part of the Cubitas Mountains, in the Province of Camaguey, and was collected by Pablo Sifontes, jr. It measures: Length, 13 mm.; greater diameter, 8.5 mm.; lesser diameter, 6.75.; length of aperture within, 4 mm.; width of aperture within, 3 mm.

OPISTHOSIPHON (OPISTHOSIPHONA) EVANIDUM DEGENERATUM, new subspecies.

Plate 41, figs. 3 and 8.

This subspecies is characterized only by its persistently smaller size, but in all other respects it could hardly be separated from the typical subspecies. The spiral cords within the umbilicus are reduced to the minimum, in some specimens being scarcely observable.

Type.—Cat. No. 314956, U.S.N.M., was collected by Torre and P. Sifontes, Sr., at Santa Cruz, a detached hill, on the right bank of the river Maximus opposite "Los Cangilones" in the Province of Camaguey, Cuba. It measures: Length, 11. mm.; greater diameter, 7.25 mm.; lesser diameter, 5.75 mm.; length of aperture within, 3.75 mm.; width of aperture within, 3 mm.

OPISTHOSIPHON (OPISTHOSIPHONA) OCCULTUM, new species.

Plate 41, figs. 4, 6, and 7.

The shell is ovate-conic, spire decollated, leaving three and a half to four moderately convex whorls, the last very slightly solute, the umbilicus being almost wholly covered by an expansion of the peristome. The color ranges from a light straw to a light amber and is always ornamented by encircling rows of elongated chestnut spots which appear upon the reflected portion of the peristome. These spots are often so exposed as to give an appearance of axial rows as well as spiral; in no instances are there solid color bands. The sculpture consists of axial riblets, more widely spaced upon the early postnuclear whorls and more crowded upon the last whorl, where there are five to six to a millimeter. Many of these axial

riblets expand into hollow white bulbs at the suture above, imparting to it an irregular crenulate appearance. Spiral sculpture is confined to the umbilical wall and consists of a series of low cords which are, in perfect specimens, concealed by the expanded peristome covering the umbilicus. The aperture is vertical, oblong-ovate and obtusely angled above; the peristome is doubled, the inner peritreme of which is decidedly projecting; the outer peritreme is broadly expanded and bent forward on the outer or right side of the aperture; it is less broadly expanded but somewhat fluted at the lower portion of the aperture; on the inner or left side of the aperture it is suddenly recurved back, forming a notch and completely covering the umbilicus except for a slight chink behind the notch; it also covers and is adnate to the whorl above; above the posterior angle the outer peritreme is strongly expanded into a projection affixed to the whorl above on its inner and flaring out on its outer side: the face of this projection is roughly, concentrically ribbed. Back of this projection is a small siphon which deflects backwards and downwards into the narrow space between the solute portion of the last whorl and communicating with the axis of the shell. Communication with the interior of the shell is through a small pore near the anterior angle of the aperture. The operculum is typical of the genus.

Type.—A female specimen, Cat. No. 314957, U.S.N.M., from Loma de Borje, measures: Length, 13.8 mm.; greater diameter, 7.8 mm.; lesser diameter, 6.75 mm.; length of aperture within, 4.6 mm.; width of aperture within, 3.5 mm. The smallest specimen observed in a large series has a length of 10.75 mm.

The type lot is from the Loma de Borje, an isolated hill near the eastern end of the Cubitas range, on the right side of the river Maximus, and was collected by Miss Barbara Hubbard. Other lots are from "Santa Cruz" between "Las Minas" and "Los Cangilones" and in "Yaguajay," all localities in a series of isolated hills near "Borje," in the municipality of Nuevitas, Province of Camaguey, Cuba; collected by Torre.

Specimens from "Borje" are usually somewhat larger than those from other localities.

OPISTHOSIPHON (OPISTHOSIPHON) PROTRACTUM, new species.

Plate 41, figs. 5 and 11.

The shell is oblong-ovate, spire decollated, leaving three and a half whorls moderately convex, the last whorl shortly solute, the umbilicus completely closed by an expansion of the peristome. The suture is deeply impressed and crenulated. The color is chestnut, rather shining and with a series of indistinct interrupted color-bands of a darker chestnut. There are seven of these narrow bands on the body whorl of the type specimen. The sculpture consists of

axial threads, somewhat wavy and separated by spaces of double their width. These threads are somewhat more numerous upon the last two whorls than upon the earlier postnuclear ones, there being about six to the millimeter. At the summit of the whorls these threads are somewhat tufted, two or three uniting and expanded into hollow whitish bulbs, thus rendering the sutures irregularly denticulate. Spiral sculpture consists of obsolete cords made visible only by slight swellings at their intersections with the axial threads and only observable near the summits of the early postnuclear whorls. Stronger spiral cords are present on the umbilical walls. The aperture is vertical, oblong-ovate, and hardly angled above; the peristome is double, the inner peritreme of which is considerably produced and sculptured upon its outer side in conformity with the surface of the shell; the outer peritreme is but moderately expanded and somewhat recurved backwards; on the inner side it is extended back and covers closely the umbilicus and is adnate to the adjoining whorl; above the aperture it is irregularly expanded into an ear-shaped projection, which supports a siphon which points directly backward and inward, ending in the space between the solute last whorl and the penultimate whorl. This siphon communicates with the interior of the shell through a small puncture within the aperture at its posterior end. The operculum is typical of the genus.

Type.—Cat. No. 314958, U.S.N.M., was collected by Dr. Thomas Barbour in the Sierra de San Juan de los Perros, near Punta Alegre in the northern part of the jurisdiction of Moron, Province of Camaguey, Cuba. It measures: Length, 16.25 mm.; greater diameter, 9 mm.; lesser diameter, 7.75 mm.; length of aperture within, 5.4 mm.; width of aperture within, 4.25 mm.

Some specimens are lighter in color than the type, in which case the color bands are more readily observed. In no cases are these color bands solid, but are broken more or less into elongated spots.

OPISTHOSIPHON (OPISTHOSIPHON) JUDASENSE, new species.

Plate 41, figs. 9, 10.

The shell is elongate-ovate, the spire decollated, leaving three and a half to four moderately convex whorls, the last being very slightly solute. The sutures are deeply impressed and denticulate. The color ranges from chestnut, in the type, to dark straw and is encircled by a series of interrupted narrow color bands of a darker tint than the background, but very indistinct in the darker specimens. These encircling color bands are produced upon the expanded peristome. The sculpture consists of fine axial threads widely spaced upon the early postnuclear whorls and constantly increasing in number upon the later whorls and reaching their maximum number of ten to the millimeter just back of the aperture. About every second or third of these axial threads are expanded at the summit of

the whorls into white hollow sublamellar bulbs. The spiral sculpture is reduced upon the outer surface of the shell to obsolete cords rendered visible only upon the early postnuclear whorls by slight swellings of the axial threads. On the umbilical wall are a number of spiral cords. The vertical aperture is oblong-ovate, not angled above; the peristome is double; the inner peritreme very slightly projecting; the outer peritreme is rather widely expanded, flaring forward except over the umbilical portion, where it is sharply deflected backwards and partially covers the umbilicus, above which it again flares forward and is adnate to the preceding whorl; above the aperture it is expanded backwards into a delta-shaped projection, which is coarsely concentrically ribbed upon its face and terminates in a thick short siphon bent back and downward into the space between the solute last whorl and the adjoining whorl. This siphon communicates with the interior of the shell through a large pore within the posterior margin of the aperture. The operculum is typical of the genus.

Type.—Cat. No. 314959, U.S.N.M., was collected by Doctor Barbour at the Sierra de Judas in the jurisdiction of Mayajigua, Province of Santa Clara, Cuba, and measures: Length, 14.4 mm.; greater diameter, 8.8 mm.; lesser diameter, 6.5 mm.; length of aperture within, 5mm.; width of aperture within, 3.9 mm.

This species differs from its nearest ally by its short inner peritreme, its greatly expanded outer peritreme, and its umbilicus but partially concealed. Its sculpture is much finer upon the last whorls, the axial threads being straighter.

OPISTHOSIPHON (OPISTHOSIPHON) DETECTUM, new species.

Plate 42, fig. 1.

The shell is ovate-conic, the spire decollated, leaving three and a half convex whorls, the last shortly solute, openly umbilicated. The color is light brown suggesting bronze, somewhat darker on the first postnuclear whorl and with no color bands or spots whatever. The sculpture consists of widely spaced axial lamellar riblets; these are very thin and sharp and white in color, each riblet being expanded at the suture above into hollow lamellar tubercles and thus crenulating the deeply impressed suture. These axial riblets possess just below the suture a slight thickening which represents an obsolete spiral cord; on the umbilical wall are several low spiral cords. The aperture is vertical, rounded ovate, but without angle above; the inner peritreme is very slightly projecting; the outer peritreme is moderately expanded throughout and slightly fluted on the inner projection; it is not expanded over the umbilicus, but touches the whorl above. Above the aperture it projects upwards and slightly backwards and merges into a sharply recurved siphon which passes down into the the space behind the solute last whorl. The siphon communicates

with the inside of the shell through a pore or small opening within the aperture on its posterior margin. The operculum is typical of the genus.

Type.—Cat. No. 314960, U.S.N.M., was collected by Torre at Las Casimbas de las Llanadas, Sierra de Canoa, Mayajigua, Province of Santa Clara, Cuba. It measures: Length, 10 mm.; greater diameter, 6.8 mm.; lesser diameter, 5 mm.; length of aperture within, 3.25 mm.; width of aperture within, 2.75 mm.

OPISTHOSIPHON (OPISTHOSIPHON) OBTECTUM, new species.

Plate 42, figs. 2-3.

The shell is elongate-ovate, the spire decollated, leaving three and a half whorls which are convex and separated by impressed sutures; the last whorl is scarcely solute. The color is a dark straw, somewhat golden, the first postnephonic whorl being often slightly darker; obsolete color spots are faintly distinguishable on some specimens. The sculpture consists of widely spaced, quite regularly disposed, axial riblets which, in the typical subspecies, are sublamellose. Practically all the riblets are expanded into hollow lamellar white bulbs at the summit of the whorls, thus finely denticulating the sutures; obsolete spiral elements are so reduced as to leave slight traces in a thickening of the axial riblets at the points of intersection. These are to be observed only in the first postnuclear whorls and sometimes not to be detected at all. Low, spiral cords are present on the umbilical wall. The vertical aperture is slightly ovate without angle above; the inner peritreme is projecting and slightly bent outward; the outer peritreme is moderately expanded about evenly on all sides; on the inner side it is suddenly reflected backwards and covers the umbilical opening, though not widely extending over the umbilical region; it then touches and is appressed to the whorl above; above the aperture it is moderately expanded and projected backwards, from which projection begins a recurved siphon which points downward into the widened suture behind the aperture. The siphon communicates with the interior of the shell through a small pore just within the aperture on its posterior margin. The operculum is typical of the genus.

Measurements are given under the subspecific titles.

OPISTHOSIPHON (OPISTHOSIPHON) OBTECTUM OBTECTUM, new subspecies.

Plate 42, figs. 2-3.

This, the typical subspecies, has the axial riblets somewhat more pronounced. The outer peritreme is more expanded and the general shape of the shell is more slender than in *Opisthosiphon (Opisthosiphon) obtectum tenuicostatum*.

Type.—Cat. No. 314961, U.S.N.M., was collected by Torre at El Palenque de Taguayabon, near Remedios. It measures: Length, 13.1 mm.; greater diameter, 8 mm.; lesser diameter, 6 mm.; length of aperture within, 4 mm.; width of aperture within, 3.5 mm. Another specimen, a male, measures: Length, 10.5 mm.; greater diameter, 6.4 mm.; lesser diameter, 5 mm.

This subspecies was also found at the Cuevo del Muerto in the Sierra de Meneses, District of Yaguajay, by Torre; also from the Caverna Las Damas by the bank of the river Zazoe, near Guayos, by Goodrich. These localities are all in the Province of Santa Clara, Cuba.

OPISTHOSIPHON (OPISTHOSIPHON) OBTECTUM TENUICOSTUM, new subspecies.

Plate 42, figs. 4, 5.

This differs from the typical subspecies in its somewhat more inflated form, by the more narrowly expanded peristome and its more flattened axial threads. In this subspecies evidences of spiral sculptural elements, except those within the umbilicus, are almost wholly obsolete.

Type.—Cat. No. 314962, U.S.N.M., was collected by Torre at Cerro de La Puntilla, near Remedios, Province of Santa Clara, Cuba. It measures: Length, 11 mm.; greater diameter, 7 mm.; lesser diameter, 6.1 mm.; length of aperture within 3.9 mm.; width of aperture within, 3.4 mm. A male specimen measures: Length, 9 mm.; greater diameter, 6.25 mm.; lesser diameter, 5 mm.

OPISTHOSIPHON (OPISTHOSIPHON) LAMELLICOSTATUM, new species.

Plate 42, figs. 6, 7.

The shell is elongate-conic, the apex decollated, having three and a half to four convex whorls, the last nonsolute; the umbilicus closed by expansion of the peristome; the sutures well impressed. The color is yellowish straw, slightly darker on the first postnuclear whorl; no color bands or spots present. The sculpture consists of widely spaced, regularly disposed, lamellar riblets, somewhat more widely spaced on the early postnuclear whorls. At the summit of the whorls these riblets are expanded into hollow, white, bladeliike tubercles which rather regularly crenulate the suture. Between these axial riblets and parallel with them is a series of exceedingly minute crinkly lirations, visible only through a lens; the spiral sculpture is obsolete, being merely indicated by bladeliike projections on the axial riblets, more apparent upon the earlier whorls. On the umbilical wall are a number of obsolete axial cords also indicated by a series of flat tubercles upon the axial riblets. The aperture is ovate, obsoletely angled above; the peristome is double, the inner peritreme slightly projecting; the outer peritreme is broadly expanded, about

equally so all around, somewhat fluted and coarsely, concentrically sculptured with hollow ribs on its face; at the umbilical region it is suddenly deflected backwards and is closely appressed into the umbilicus, completely sealing it. It is adnate to the whorl above and above the aperture is further expanded into a delta shaped projection, deflected backwards terminating in a siphon which is projected downwards into the suture just back of the aperture; the siphon communicates with the interior of the shell by a puncture just within the aperture at its posterior angle. The operculum is typical of the genus.

Type.—Cat. No. 314963, U.S.N.M., was collected by Torre at Boqueron del Tatibonico, on the boundary between the Provinces of Santa Clara and Camaguey. It is a female specimen, and measures: Length, 12 mm.; greater diameter, 7 mm.; lesser diameter, 5.5 mm.; length of aperture within, 3.5 mm.; width of aperture within, 2.75 mm. A male specimen from the same lot measures: Length, 11 mm.; greater diameter, 6.5 mm.; lesser diameter, 5 mm.

EUTUDORA (EUTUDOROPS) PARADOXUM, new species.

Plate 42, figs. 8, 9.

The shell is elongate-ovate, the apex usually decollated, leaving four to four and a half rather convex whorls, the last slightly solute. Sutures deeply impressed; umbilicus closed by an expansion of the peristome. The color is white, sometimes with a slight yellowish cast, and having six to eight encircling bands of light chestnut spots; some specimens having no color markings whatever. The sculpture consists of axial sublamellar riblets, widely spaced upon the earlier postnuclear whorls, and densely crowded upon the last whorl, where they become threadlike; at the summit of the whorls the riblets are expanded in varying degrees into hollow, narrow bulbs and irregularly crenulate the sutures; spiral sculpture consists of more or less obsolete cords, not always to be distinguished, but generally indicated by prominences upon the axial riblets at their points of intersection. On the umbilical wall the spiral cords are more prominent. The vertical aperture is almost round, without angle above; the inner peritreme is strongly projecting; the outer peritreme consists merely of a slightly exaggerated axial riblet, between which and the rim of the aperture are seven or eight normal axial riblets. The outer peritreme is slightly more expanded on the inner side and is suddenly deflected backward to cover and seal the umbilicus well within the umbilical opening, and is adnate to the whorl above; a small expansion above the aperture is bent backward to form a siphon which projects into the space behind the solute portion of the last whorl; the siphon communicates with the interior of the shell through a puncture just within the aperture in its posterior portion. The operculum is typically Tudoroid, the lamellae springing from the chondroid plate being bent

outward to parallel the plate and overlapping to form a flat surface, thus forming a double operculum with a deep groove around its margin.

Type.—A female specimen, Cat. No. 314964, U.S.N.M., was collected by Torre and Sifontes at Santa Cruz Mountains, on the right bank of the River Maximus, opposite Los Cangilones, in the Province of Camaguey, Cuba. It measures: Length, 10.8 mm.; greater diameter, 6 mm.; lesser diameter, 5.25 mm.; length of aperture within, 3.25 mm.; width of aperture within, 3 mm. A male specimen from the same lot, with tip present, measures: Length, 10 mm.; greater diameter, 5.1 mm.; lesser diameter, 4.75 mm.

This species, which bears a strong resemblance through all its shell characters to the numerous species herein described from the same region, must nevertheless be placed in the genus *Eutudora* by reason of its operculum, which is typical of that genus. It falls naturally into the group of *Eutudora torquatum* of the subgenus *Eutudorops*, by reason of its sculptural characters.

EXPLANATION OF PLATES.

PLATE 38.

- FIG. 1. *Opisthosiphon (Opisthosiphona) berryi* Clapp.
 2. *Opisthosiphon (Opisthosiphona) berryi* Clapp.
 3. *Opisthosiphon (Opisthosiphona) berryi* Clapp.
 4. *Opisthosiphon (Opisthosiphona) berryi* Clapp.
 5. *Opisthosiphon (Opisthosiphona) berryi semiapertum*, new subspecies.
 6. *Opisthosiphon (Opisthosiphona) berryi semiapertum*, new subspecies.
 7. *Opisthosiphon (Opisthosiphona) berryi semiapertum*, new subspecies.
 8. *Opisthosiphon (Opisthosiphona) berryi semiapertum*, new subspecies, type.
 9. *Opisthosiphon (Opisthosiphona) paredonense*, new species.
 10. *Opisthosiphon (Opisthosiphona) paredonense*, new species.
 11. *Opisthosiphon (Opisthosiphona) paredonense*, new species, type.

PLATE 39.

- FIG. 1. *Opisthosiphon (Opisthosiphona) paredonense transitorium*, new subspecies,
 2. *Opisthosiphon (Opisthosiphona) paredonense transitorium*, new subspecies,
 type.
 3. *Opisthosiphon (Opisthosiphona) obturatum*, new species.
 4. *Opisthosiphon (Opisthosiphona) obturatum*, new species, type.
 5. *Opisthosiphon (Opisthosiphona) obturatum*, new species.
 6. *Opisthosiphon (Opisthosiphona) obturatum*, new species.
 7. *Opisthosiphon (Opisthosiphona) obturatum subobturatum*, new subspecies,
 type.
 8. *Opisthosiphon (Opisthosiphona) obturatum subobturatum*, new subspecies.
 9. *Opisthosiphon (Opisthosiphona) obturatum subobturatum*, new subspecies.
 10. *Opisthosiphon (Opisthosiphona) obturatum subobturatum*, new subspecies.
 11. *Opisthosiphon (Opisthosiphona) obturatum subobturatum*, new subspecies.

PLATE 40.

- FIG. 1. *Opisthosiphon (Opisthosiphona) apertum*, new species.
 2. *Opisthosiphon (Opisthosiphona) dalli* Torre and Henderson.
 3. *Opisthosiphon (Opisthosiphona) apertum*, new species, type.
 4. *Opisthosiphon (Opisthosiphona) bioscai*, new species, type.
 5. *Opisthosiphon (Opisthosiphona) salustii*, new species.
 6. *Opisthosiphon (Opisthosiphona) bioscai*, new species.
 7. *Opisthosiphon (Opisthosiphona) salustii*, new species, type.
 8. *Opisthosiphon (Opisthosiphona) dalli* Torre and Henderson, type.
 9. *Opisthosiphon (Opisthosiphona) dalli* Torre and Henderson.

PLATE 41.

- FIG. 1. *Opisthosiphon (Opisthosiphona) evanidum*, new species, type.
 2. *Opisthosiphon (Opisthosiphona) evanidum*, new species.
 3. *Opisthosiphon (Opisthosiphona) evanidum degeneratum*, new subspecies, type.
 4. *Opisthosiphon (Opisthosiphona) occultum*, new species, type.
 5. *Opisthosiphon (Opisthosiphona) protractum*, new species.
 6. *Opisthosiphon (Opisthosiphona) occultum*, new species.
 7. *Opisthosiphon (Opisthosiphona) occultum*, new species.
 8. *Opisthosiphon (Opisthosiphona) evanidum degeneratum*, new species.
 9. *Opisthosiphon (Opisthosiphona) judasense*, new species.
 10. *Opisthosiphon (Opisthosiphona) judasense*, new species, type.
 11. *Opisthosiphon (Opisthosiphona) protractum*, new species, type.

PLATE 42.

- FIG. 1. *Opisthosiphon* (*Opisthosiphon*) *detectum*, new species, type.
2. *Opisthosiphon* (*Opisthosiphon*) *obtectum*, new species, type.
3. *Opisthosiphon* (*Opisthosiphon*) *obtectum*, new species.
4. *Opisthosiphon* (*Opisthosiphon*) *obtectum tenuicostum*, new subspecies, type.
5. *Opisthosiphon* (*Opisthosiphon*) *obtectum tenuicostum*, new subspecies.
6. *Opisthosiphon* (*Opisthosiphon*) *lamellicostatum*, new species, type.
7. *Opisthosiphon* (*Opisthosiphon*) *lamellicostatum*, new species.
8. *Eutudora* (*Eutudorops*) *paradoxum*, new species, type.
9. *Eutudora* (*Eutudorops*) *paradoxum*, new species.